

Instruments for assessing nurses' palliative care knowledge and skills in specialised care setting: an integrative review.

Concise title: Nurses' palliative care knowledge and skills

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Abstract

Aims and objectives: To examine the content and reported psychometric properties of instruments for assessing nurses' palliative care knowledge and skills in specialised healthcare units.

Background: Knowledge of palliative care, and competence in the delivery of care, are essential. Assessment of competence is an important means of *evaluating* the knowledge and skills of practitioners in order to improve the quality of care provided for patients and their families.

Design: An integrative review.

Methods: A systematic literature search was conducted in November 2018 in five databases: CINAHL, PubMed (Medline), Cochrane, Scopus and Web of Science. The quality assessment was conducted using the Joanna Briggs Institute's (JBI) Checklist for Analytical Cross-Sectional Studies. The data was analysed using content analysis. PRISMA guidelines were followed to ensure explicit reporting.

Results: Overall, 5,413 studies were identified and 23 met the inclusion criteria. Nurses' knowledge and skills, as assessed by the instruments, were: 1) care for the patient, 2) care for the patient's family and 3) professional requirements. Ten instruments were identified assessing nurses' knowledge and skills through knowledge tests and skill-evaluation self-tests. The psychometric properties of the instruments were reported to varying degrees, mainly focusing on internal consistency and content validation.

Conclusions: Nurses' knowledge and skills were seen to contribute to the holistic care of the patient and his or her family, and the possession of adequate information and skills is essential when dealing with death and dying. The instruments are commonly available and potentially

reliable, although reliability must be determined with caution, so validation studies in other cultures are recommended.

Relevance to clinical practice: These results could be utilised to improve the quality of palliative care by evaluating the knowledge and skills of nursing staff, or when considering the needs of palliative care education.

KEYWORDS: Palliative care, terminal care, nursing, instrument, psychometrics, knowledge, skills, assessing, integrative review.

What does this paper contribute to the wider global clinical community?

Summary:

- An assessment of proficiency is needed to enhance the quality of palliative care by identifying and improving palliative care nurses' expertise; however, such assessment requires valid and reliable instruments.
- Knowledge tests can be used to form an objective judgement of nurses' knowledge of palliative care, and self-evaluation tests can be used to assess nurses' self-perceived confidence in performing palliative care.
- The findings of this review can be utilised to enhance the quality of palliative care nursing by determining applicable instruments for assessing nurses' palliative care knowledge and skills, as well as developing nursing education and lifelong learning.

1. Introduction

The World Health Organization (WHO) defines palliative care as ‘an approach that improves the quality of life of patients and their families facing the problem associated with life-threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems: physical, psychosocial and spiritual’ (WHO, 2019). According to the European Association for Palliative Care (EAPC), all healthcare professionals should be able to provide appropriate palliative care and be able to meet the needs of patients and their relatives through palliative care treatment (Gamondi, Larkin, & Payne, 2013). Nurses are vital to the delivery of palliative care and nurses’ palliative care competence is essential for ensuring high-quality care. Consensus exists regarding the fact that a lack of experience, knowledge and education is a common obstacle to quality care (Ahmed et al., 2004; Espinosa, Young & Walsh, 2008; Huijjer, Abboud, & Dimassi, 2009; Slatten, Fagerström, & Hatlevik, 2010; White & Coyne, 2011; Schulman-Green, Ercolano, Jeon, & Dixon, 2012).

At a general level, competence in palliative care nursing can be defined as a combination of knowledge, skills and attitudes involving evidence-based physical, emotional, psychosocial and spiritual care (Sherman, Matzo & Metheny, 2010). In many countries, such as Great Britain, New Zealand, the USA, Canada, and Ireland, defined frameworks detail the areas of competence for palliative care (Connolly, Charnlay & Reagan, 2012; Connolly, Ryan & Charnlay, 2016). For example, the core areas of palliative care as defined by the US National Consensus Project for Quality Palliative Care include the structure and process of care, along with the physical, psychological, psychiatric, social, spiritual, religious and existential aspects of care. Cultural, ethical and legal factors are also important at the end of life (Ferrell, Twaddle, Melnick & Meier, 2018). From a European perspective, the main competence areas reflect those identified above, although European guidelines also pay attention to the operating environment for patients and their families,

implementing comprehensive cooperation and multi-professionalism, developing interaction skills, and identifying nurses' own skills and continuing professional development (Gamondi et al., 2013).

Knowledge of palliative care is essential in ensuring the delivery of professional care.

Globally, more than 40 million people annually need palliative care. Palliative care is an approach to care that is relevant to all long-term enduring illnesses and a range of conditions such as cardiovascular disease, cancer, chronic respiratory diseases, AIDS, diabetes and neurological conditions, including dementia. The need for palliative care is increasing as the population ages: the majority of patients requiring palliative care are over 60 years old (WCPA & WHO, 2014) and the cost of end-of-life care is high (Haltia et al., 2018). It is accepted that the number of people over the age of 60 in the world population will almost double by 2050 (WHO, 2018). A similar phenomenon can also be seen in Europe, where the ageing population has been increasing for several decades and the number of people aged over 65 is expected to increase further (Eurostat, 2018).

The knowledge, skills and attitudes of healthcare professionals who provide care for the dying has a significant impact on what kind of care is delivered in practice (Harris, Gaudet & O'Reardon, 2014). To ensure the quality of palliative care, healthcare professionals working in palliative care teams need to have a sufficient level of competence in palliative and end-of-life care (Hales, Zimmermann & Rodin 2010; Miyashita, Sanjo, Morita, Hirai & Uchitomi, 2007; Schulman-Green et al., 2011; Weissman & Blust, 2005). The self-assessment of competence has been shown to develop the palliative care skills of nurses and improve the quality of care (Desbiens, Gagnon & Fillion, 2011). A range of measurement indicators have been used to assess nurses' competence in palliative care (Huijjer et al., 2009; Bing-Jonsson et al., 2014; Mager & Lang, 2016; Yaakup et al., 2014), however there is no consensus on the instruments for measuring nurses' palliative competence.

2. Aim

The aim of this integrative literature review was to examine the content and reported psychometric properties of instruments used for assessing nurses' palliative care knowledge and skills in specialised care settings.

The review questions were:

1. What knowledge and skills of nursing staff is assessed in palliative care?
2. What instruments have been used to assess nurses' palliative care knowledge and skills?
3. What is the validity and reliability of the instruments used to assess palliative care knowledge and skills?

3. Methods

3.1 Design

An integrative review method was used to facilitate the inclusion of studies that used different research methodologies. This approach was considered to be applicable as it allows the combination of findings from several research designs. Integrative reviews are also relevant to the exploration of topics about which little is known and of relevance to practice (Whittemore & Knafl, 2005). The review was conducted in line with the five stages specified by Whittemore and Knafl's (2005) integrative review methodology: 1) identification of the problem, 2) literature search, 3) data evaluation, 4) data analysis and 5) presentation of the results. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines for systematic literature reviews and meta-analyses were followed to ensure explicit reporting (Supplementary File 1).

3.2 Search Strategy

An integrative review was conducted in a systematic manner in November 2018 in the following databases: CINAHL, PubMed (Medline), Cochrane, Scopus and Web of Science. A health science reference librarian was consulted to ascertain and refine the validity of the search terms. The search consisted of the following keywords, their synonyms and MeSH-terms, using

Boolean operators: ‘palliative, hospice, terminal or end-of-life care, competence, knowledge, skill or ability’ and ‘nurse, healthcare personnel, healthcare staff, nursing staff or nursing personnel’. In addition, a manual search was conducted using a library database to ensure that all studies dealing with knowledge - or skill-measuring instruments were included. Although attitude is defined as one dimension of overall competence, the intention of this review was to particularly examine the nurses’ knowledge and skills, rather than their attitudes towards their work in palliative care. Therefore, studies that used instruments to assess only attitudes were not included in this review.

Palliative care has received increasing attention during the 2000s. It has been recognized as part of essential health care by many international organizations such as the European Committee of Ministers, the WPCA, and Human Rights Watch (WPCA & WHO, 2014). A search and analysis of research that has been carried out within last ten years was judged to be relevant given the growth in development of instruments focussed on palliative care over this timeframe. The search was limited to studies published with an available abstract between 1 January 2008 and 31 October 2018. The inclusion criteria specified that a study must: 1) include an instrument for assessing skills and knowledge, 2) apply the assessment to nursing professionals, 3) use a sample of nursing professionals working with adult palliative care patients in specialised care settings and 4) be scientific and peer-reviewed empirical study.

The criteria for exclusion were studies that: 1) examined other types of healthcare professionals or nursing students, 2) concerned only paediatric nursing or 3) did not include an instrument used for assessing knowledge or skills, 4) concerned practice in primary care, nursing homes, geriatric or older people care units or 5) were dissertations, editorials, statements or theoretical papers.

3.3 Retrieval of the Studies

The study retrieval was conducted in four phases. In the first phase, as a result of database searches, a total of 5,413 studies were identified: CINAHL n=1,945, Web of Science n=1,695,

Scopus n=975, PubMed n=760 and Cochrane n=38. In the second phase, titles were screened and duplicates removed; hence, a total of 263 studies met the inclusion criteria and were selected to be screened by abstract. Additionally, a manual search provided two studies. In the third phase, studies were screened by abstract and the screening was conducted independently by two authors (A. S-J. & E. H.), resulting in a total of 85 studies selected for full-text assessment. Altogether, 181 studies were excluded by abstract because they did not meet the inclusion criteria or suit the topic of the review. At this point of the appraisal, a limitation on language was also imposed so that articles written in languages other than English or Swedish were excluded (n=11). In the fourth phase of the retrieval, full-text articles were assessed by two authors (A. S-J. & E. H.). At this stage, 62 studies were excluded because they did not concern knowledge or skills, did not include an instrument for knowledge or skill assessment, knowledge and skills were not assessed in detail, the study was conducted in a primary or tertiary care setting, study participants were mainly taking care of non-palliative patients, nurses and other healthcare professionals could not be identified in the study results or the study only considered educational programmes. Eventually, 23 studies remained and were included in the quality appraisal (Fig. 1).

3.4 Quality Appraisal

The quality assessment in this study was accomplished using the Joanna Briggs Institute's (JBI) seven-item Checklist for Analytical Cross-Sectional Studies quality appraisal tool (JBI, 2017). Studies were scored using the quality appraisal tool, with answer option 'yes' assigned one point and options 'no' and 'unclear' assigned zero points.

The quality appraisal was conducted by four authors: (A. S-J. & T. L.), (A. S-J. & E. H.) and (A. S-J. & M. H.). Following an independently conducted assessment, an absolute consensus was achieved through discussion. The final assessments were confirmed by two of the authors (A. S-J. & E. H.).

The quality of the studies was generally good, but there were some variations between studies. The overall quality scores ranged from 3/5 to 5/5 and 5/7 to 6/7, but the variation in the number of applicable criteria between different studies was taken into consideration. The scale for the appraisal of the studies was either 0–5 or 0–7, depending on how many of the criteria were included in each of the studies (Table 1).

3.5 Data Analysis

The initial data analysis phase involved compiling all the included studies into a table to obtain an overall view of the studies. General information about the studies was tabulated and this included the authors, year and country of publication, the purpose of the study, study design, number and description of participants, data collection method, analysis methods and outcomes of the study (Table 1).

Thereafter, a qualitative content analysis of the instruments was conducted by three of the authors (A. S-J., E. H. & M. H) based on the research questions and the aim of this review as stated previously (Aveyard, 2007; Whitemore & Knafl, 2005). The sentences or definitions describing nurses' knowledge and skills were identified and collated as original expressions, exactly as they were written in the instruments. After the original expressions had been collected and collated, they were reduced to their essential content (Elo & Kyngäs, 2008). Thereafter, the simplified, reduced expressions were analysed so that similar content could be identified and categorised. This categorisation was refined and repeated several times in order to maintain the consistency of the reduced expressions' content and to find the common factors between the expressions; thus, categorised expressions with similar content were classified as subcategories. Subcategories were then combined into categories that unified the content and, finally, these were synthesised into main categories (Table 2).

The psychometric properties of the instruments used were evaluated by examining the features of the ten instruments reported in the studies; for example, validity, feasibility, repeatability and sensitivity to change (Table 3).

4. Results

4.1 Description of the Studies

A total of 23 studies were included in this review (Table 1). Most of the studies were published between 2012 and 2018 and only two of the studies were published earlier. All of the studies were conducted in specialised hospital settings in Japan (n=5), the USA (n=4), Korea (n=3), Spain (n=2), Iran (n=2), Canada (n=2), and one study each in Israel, Taiwan, Vietnam, Saudi-Arabia and Norway. Except for one study, all the study designs were cross-sectional and most of the studies took a descriptive approach. All of the studies were conducted using a quantitative method; however, a few studies also contained a minor qualitative component. The sample size varied from 90 to 7,922 and most of the participants were nurses, although two of the studies included other healthcare professionals, with the participation of the nurses reported separately (Lazenby et al., 2012; Montagnini et al., 2018).

Overall, ten instruments were identified from the included studies (Table 3). Five of the instruments had a component for knowledge assessment, and five of the instruments were self-evaluation tests.

4.2 Nurses' Palliative Care Knowledge and Skills

Nurses' palliative care knowledge and skills were defined according to three main categories: 1) care for the patient, 2) care for the patient's family, and 3) professional requirements (Table 2). Nurses' knowledge and skills, as defined in the instruments, described patients' holistic care, taking into account the different areas of life in the care of dying patients. The basis of palliative care knowledge and skills is an understanding of the core palliative care philosophy that underpins palliative care. In the instruments, care for the family includes similar elements to those

involved in care for the patient. Nevertheless, care for the family mainly provides mental support for the family and helps the family to cope with the patient's illness. The personal knowledge and skills required of nurses are necessary when dealing with incurably ill patients, death, and dying.

4.2.1 Palliative care knowledge and skills regarding care for the patient.

In the instruments, nurses' palliative care knowledge and skills regarding care for the patient were divided into eight categories: 1) the general basis of palliative care, 2) the patient's involvement in his or her own care 3) psychosocial support, 4) spirituality, 5) the cultural aspects of care, 6) pharmacological treatment, 7) physical symptom management and 8) end-of-life care (Table 2).

The general basis of palliative care included two subcategories: knowledge and skills concerning the principles of palliative care and identifying patients' suitability for palliative care. The principles consisted of understanding the philosophy and guidelines of palliative care and recognising the active nature of palliative care, its compatibility with aggressive treatment and its relationship to other treatments. Identifying the suitability of palliative care for a patient and being able to determine when a patient needs palliative care were also important characteristics of the general basis of palliative care (Kim et al., 2011; Choi et al., 2012; Ly et al., 2014; Iranmanesh et al., 2014; Abudari et al., 2014; Shimizu et al., 2016; Chover-Sierra et al., 2017a; Chover-Sierra et al., 2017b; Schnell-Hoehn et al., 2017;

The patient's involvement in his or her own care included two subcategories: supporting the patient's decision-making and supporting the patient in managing his or her daily life. Supporting the patient's decision-making meant communicating with the patient, discussing the patient's care, giving reliable information about the patient's possibility of participating in the decision-making process and making informed decisions regarding the patient's care (Desbiens & Fillion, 2011; Ly et al., 2014; Price et al., 2017). Supporting the patient in managing their daily life involved an assessment of the needs of the patient as well as helping the patient to maintain his or her

independence in the activities of daily living (Desbiens & Fillion, 2011; Ly et al., 2014; Slatten et al., 2014).

Psychosocial support was divided into two sub-categories: identifying patients' psychosocial needs and supporting the patient in coping with a life-limiting illness. The nurse's competence in the identification of the psychosocial needs of the patient included an ability to assess the emotional distress a patient experiences and, secondly, to recognise and understand the patient's grief and sorrow (Kim et al., 2011; Autor et al., 2013; Kim & Hwang, 2014; Iranmanesh et al., 2014; Price et al., 2017; Schnell-Hoehn et al., 2017). Supporting the patient in coping with a life-limiting illness meant that the nurse had to have the necessary skills to assist the patient in meeting their social needs, promote communication between family members (Desbiens & Fillion, 2011; Ly et al., 2014) and also provide care such that the patient and his or her family are able to identify resources to cope with the distress and bereavement the illness causes (Desbiens & Fillion, 2011; Ly et al., 2014; Price et al., 2017; Montagnini et al., 2018).

Spirituality included two subcategories: assessing and recognising patients' spiritual needs and dealing with the spiritual perspectives of the patient. Spirituality included nurses' skills in assessing and recognising the patient's spiritual needs and distress during the dying process, and the nurses' capability in dealing with spiritual and religious perspectives as an element of care (Desbiens & Fillion, 2011; Ly et al., 2014; Price et al., 2017; Montagnini et al., 2018; Feder et al., 2018).

The cultural aspects of care included two subcategories: identifying cultural needs and considering the cultural aspects of the patient's care. Cultural aspects included nurses' knowledge of cultural factors that affect the patient's care and their ability to support the patient in maintaining cultural traditions at the time of death (Desbiens & Fillion, 2011; Lazenby et al., 2012; Ly et al., 2014; Price et al., 2017; Feder et al., 2018; Montagnini et al., 2018).

Pharmacological treatment included two subcategories: knowledge about the efficacy of the medication and knowledge about the side-effects of drugs that can appear during treatment.

Knowledge about the efficacy of the drugs was linked to choosing the right medication according to the patient's symptoms, knowing the interactions between drugs, and understanding the different possible routes for administering medication. Nurses needed knowledge of the side-effects that drugs can cause, especially in situations where incorrect perceptions about adverse effects could hinder the selection of the most effective medication for the palliative care patient (Nakazawa et al., 2009; Choi et al., 2012; Sato et al., 2014; Iranmanesh et al., 2014; Abudari et al., 2014; Shimizu et al., 2016; Chover-Sierra et al., 2017a; Chover-Sierra et al., 2017b; Schnell-Hoehn et al., 2017; Nakazawa et al., 2018).

Management of the physical symptoms consisted of four different subcategories: treatment of respiratory symptoms, treatment of gastro-intestinal symptoms, pain evaluation and pain management. The knowledge and skills concerning the treatment of respiratory symptoms were mainly management of dyspnoea and the ability to treat agonal respiration (Nakazawa et al. 2009; Desbiens & Fillion 2011; Sato et al. 2014, Ly et al. 2014; Shimizu et al. 2016; Price et al. 2017; Nakazawa et al. 2018). Gastro-intestinal symptom management included care for dryness of the mouth and the treatment of nausea, vomiting and constipation (Desbiens & Fillion 2011; Slatten et al. 2014; Price et al. 2017). The evaluation of patient's pain consisted of understanding the holistic nature of the pain and its connection to the life-limiting illness and, furthermore, identifying the goals of pain management (Nakazawa et al. 2009; Desbiens & Fillion 2011; Choi et al. 2012; Sato et al. 2014; Chover-Sierra et al. 2017a; Chover-Sierra et al. 2017b; Schnell-Hoehn et al. 2017; Nakazawa et al. 2018). Pain management required a knowledge of pharmacological treatments, as well as non-pharmacological and complementary interventions to alleviate pain (Desbiens & Fillion 2011; Choi et al. 2012; Slatten et al. 2014; Price et al. 2017; Chover-Sierra et al. 2017a; Chover-Sierra et al. 2017b; Schnell-Hoehn et al. 2017; Montagnini et al. 2018).

End-of-life care had three subcategories: identifying the symptoms and signs of approaching death in the patient, the physical needs of the patient at the end of life and emotional support.

Nurses need to be able to identify the physical needs of the patient in the last stages of life and, in particular, recognise those symptoms that greatly affect the patient's consciousness and discomfort during the dying phase of care. Emotionally, nurses need to be able to discuss impending death and be genuinely present for the patient at the time of death (Nakazawa et al., 2009; Choi et al., 2012; Sato et al., 2014; Shimizu et al., 2016; Chover-Sierra et al., 2017a; Chover-Sierra et al., 2017b; Schnell-Hoehn et al., 2017; Nakazawa et al., 2018).

4.2.2 Knowledge and skills regarding care for the patient's family.

When considering care for the family, as defined in the instruments, four different categories of knowledge and skills were identified: 1) involving the family in the care of the patient, 2) psychosocial support, 3) spirituality and 4) the cultural aspects of care (Table 2).

Involving the family in the care of the patient included two subcategories: the family's involvement in care planning and the family's involvement in the care itself. Nurses need to involve the family in care planning by discussing care and treatment, promoting communication (Desbiens & Fillion, 2011; Price et al., 2017; Montagnini et al., 2018) and helping to alleviate the family's burden by supporting them in providing care for their loved one (Desbiens & Fillion, 2011; Ly et al., 2014; Feder et al., 2018).

Psychosocial support consisted of three subcategories: identifying the family's psychosocial needs, supporting them in coping with the patient's illness, and providing support around dying and bereavement. Identification of psychosocial needs is important when assessing the family's resources and the effects of the patient's illness on family dynamics (Desbiens & Fillion, 2011; Price et al., 2017; Montagnini et al. 2018). Families also need assistance in finding resources for bereavement and coping with death (Desbiens & Fillion, 2011; Kim et al., 2011; Choi et al., 2012; Iranmanesh et al., 2012; Autor et al., 2013; Abudari et al., 2014; Kim & Hwang, 2014; Razban et

al., 2015; Chover-Sierra et al., 2017a; Chover-Sierra et al., 2017b; Montagnini et al., 2018; Feder et al., 2018).

Spirituality contained two subcategories: identifying the spiritual needs of the family and dealing with spirituality. From a spiritual perspective, nurses must assess what spiritual requirements family member have and recognise their spiritual distress (Desbiens & Fillion, 2011; Ly et al., 2014; Price et al., 2017; Montagnini et al. 2018). Moreover, nurses should feel comfortable when dealing with families' religious perspectives (Desbiens & Fillion, 2011; Lazenby et al., 2012; Ly et al. 2014; Feder et al. 2018).

The cultural aspects of care included two subcategories: identifying cultural needs and considering cultural factors in the care for the patient's family. It is important that nurses know how to assist the family in maintaining their cultural traditions when the patient is dying (Desbiens & Fillion, 2011; Lazenby et al., 2012; Ly et al., 2014; Price et al., 2017; Feder et al., 2018; Montagnini et al., 2018).

4.2.3 The professional knowledge and skill requirements of nurses.

In the instruments, nurses' personal requirements in palliative care were distributed across four categories: 1) personal resources, 2) collaboration skills, 3) ethics and 4) coping with death (Table 2).

Personal resources included two subcategories: identifying personal needs and resources when caring for dying people, and workplace support for staff. Nurses must have skills in managing stress and adapting to the loss of patients (Desbiens & Fillion, 2011; Kim et al., 2011; Choi et al., 2012; Iranmanesh et al., 2012; Lazenby et al., 2012; Autor et al., 2013; Abudari et al., 2014; Ly et al., 2014; Kim & Hwang, 2014; Razban et al., 2015; Chover-Sierra et al., 2017a; Chover-Sierra et al., 2017b; Schnell-Hoehn et al., 2017). Workplace support included the skills to identify the support provided by the workplace and the ability to give support to colleagues (Lazenby et al., 2012; Feder et al. 2018).

Collaboration skills were divided into two subcategories: interpersonal skills and multidisciplinary skills. Nurses, for example, need to have skills for communicating with the patient and his or her family members, and also to be able to communicate and collaborate with other professionals concerning the patient's care (Desbiens & Fillion, 2011; Slatten et al., 2014; Feder et al., 2018).

Ethics comprised two subcategories: identifying ethical issues and dealing with those ethical issues. Nurses have to recognise that consideration of ethical issues is essential in palliative care and they need to know how to provide advocacy and guidance for the patient when ethical issues relate to the care they provide (Desbiens & Fillion, 2011; Slatten et al., 2014; Arahata et al., 2018).

Coping with death consisted of two subcategories: preparedness for the patient's death and adaptation to dying. Preparedness for death requires nurses to know how to deal with death and dying and prepare for the moment of death (Slatten et al., 2014; Price et al., 2017; Arahata et al., 2018; Montagnini et al., 2018). Adaptation to dying means that nurses can cope with the grief and loss they experience when the patient dies (Desbiens & Fillion, 2011).

4.3 Instruments used for knowledge and skill assessment.

Nurse's knowledge and skills were evaluated through knowledge tests and self-assessed skill-evaluation tools. Overall, ten instruments were identified from the included studies (Table 3). Five of the instruments had a component for knowledge assessment. The Palliative Care Quiz for Nursing (PCQN – instrument) (20 items) to assess nurses' palliative care knowledge, End-of-Life Nursing Education Consortium—Japan Core Quiz (ELNEC–JC-Q – instrument) included 90 items in 9 domains assessing nurses' knowledge in end-of-life care. This instrument had also a component for attitude evaluation, which was not analysed in this review. Questionnaire on the Knowledge, Attitudes, and Behavioural Intentions of Medical personnel in Providing Artificial Nutrition and Hydration was a seven-part questionnaire including a 17 item component assessing medical personnel's knowledge in providing artificial nutrition to palliative care patients. The instrument

had components for attitudes and behavioural intentions in providing artificial nutrition too, although those components did not meet the aim of this review. The Palliative Care Knowledge Test (PCKT – instrument) was a knowledge test to assess nurses' knowledge in palliative care. The instrument consisted of 40 items. Shimizu et al. 2016 self-developed scales had 31 items to assess nurses' knowledge about palliative care. The instrument had also other components to evaluate palliative care difficulties and self-reported practices, but those were not analysed in this review.

The most commonly used knowledge test is the Palliative Care Quiz for Nursing (PCQN), which was used in ten of the studies. Knowledge in the knowledge instruments was assessed using items with 'true' or 'false' answer options (Ke et al., 2008; Kim et al., 2011; Choi et al., 2012; Autor et al., 2013; Abudari et al., 2014; Iranmanesh et al., 2014; Kim & Hwang, 2014; Shimizu et al., 2016; Chover-Sierra et al., 2017a; Chover-Sierra et al., 2017b; Schnell-Hoehn et al., 2017) or 'right' or 'wrong' answers (Nakazawa et al., 2009; Sato et al., 2014; Arahata et al., 2018; Nakazawa et al., 2018). The knowledge items mainly evaluated nurses' knowledge of the philosophy, ethics, and principles of palliative care; pain and symptom management; pharmacological care; psychological, social and cultural care; and care at the end of life (Table 3).

Nurse's palliative care skills were evaluated through self-assessment in five of the instruments (Table 3). The Palliative Care Nursing Self-competence Scale (PCNSC – instrument) was developed to evaluate nurses self-perceived skills in palliative care competencies with 10 items. The End-of-Life Professional Caregiver Survey (EPCS – instrument) evaluated end-of-life professional caregiver's core competencies in palliative care by 28 items. The End-of-Life Questionnaire (EOL – instrument), just like The Scale of End-Of-Life Care in ICU (EOL-ICU), were both evaluating healthcare professionals' self-perceived confidence in providing end-of-life care by 28 items. The EOL – instrument were developed to be used in hospitalised settings and EOL-ICU in intensive care units. Nurses Core Competencies in Palliative Care (NCPC –

instrument) evaluated nurses' agreement of the skills in palliative care core competencies by 26 items.

Skills were mostly evaluated by asking how strongly participants agreed with certain statements and were assessed using Likert-scales (Slatten et al., 2014; Price et al., 2017; Feder et al., 2018; Montagnini et al., 2018) or strength of self-assessed competence (Desbiens & Fillion, 2011). Instruments for skill evaluation included 10 to 28 items in different areas. Nurses' self-evaluated skills were assessed in relation to pain and other symptom management, psychological care, social care, spiritual care, cultural care, ethical and legal issues, inter-professional collaboration, communication, personal and professional issues connected to nursing care, end-of-life care, decision-making, continuity of care and organisational support for staff (Table 3).

The instruments assessing knowledge and skills shared content in most of the item subscales. These included pain and symptom management; psychological, social, cultural and spiritual care; and ethics. Knowledge tests included items concerning the philosophy and principles of palliative care, which were not assessed by the skill-measuring instruments. The skill evaluation instruments differed in that they included items about collaboration and communication, personal and professional issues, decision-making, continuity of care and organisational support, which the knowledge tests did not include.

4.4 Validity and reliability of measurement instruments.

The assessment of validity and reliability focused mainly on content validity, construct validity, structural validity and internal consistency (Table 3). Content validity was reported as the content validity index for three instruments (PCQN, PCNSC, Questionnaire on the Knowledge, Attitudes, and Behavioral Intentions of Medical Personnel in Providing Artificial Nutrition), performing between 0.85 and 0.95. Construct validity was reported as 'good' or 'acceptable' for two of the instruments (NCPC, Shimizu et al., 2016). Item response theory (IRT), which was used to analyse the structural validity of the instruments, were reported for three of the instruments

(PCQN; PCKT; Shimizu et al., 2016). The validity assessment of the instruments was mainly based on their internal consistency and construct validity, which were not commonly reported in most of the studies; however, validity of the instruments was evaluated and accepted by experts in some cases (Ke et al., 2008; Kim et al., 2011; Ly et al., 2014; Iranmanesh et al., 2014; Razban et al., 2015; Feder et al., 2018). Validity was also reported to be acceptable for some instruments (NCPC; PCKT; Shimizu et al., 2016; PCQN; EOL-Q).

The internal consistency was reported as a Kuder-Richardson formula (KR-20) for four of the instruments (PCQN; ELNEC—JCQ; PCKT; Questionnaire on the Knowledge, Attitudes, and Behavioral Intentions of Medical Personnel in Providing Artificial Nutrition) and this varied from 0.67 to 0.81. The internal consistency was also reported using Cronbach's alpha for seven of the instruments and it varied from 0.67 to 0.96 when considering the overall results for all of the items, although the Cronbach's alphas varied for individual items (Table 3). Some of the studies, especially those that used PCQN (Choi et al., 2012; Autor et al., 2013; Iranmanesh et al., 2014; Abudari et al., 2014; Chover-Sierra et al., 2017b; Schnell-Hoehn et al., 2017) or studies that used an instrument that had been recently validated (Sato et al., 2014; Nakazawa et al., 2018), reported reliability based on previous studies (Table 3). The intraclass correlation coefficient or Cohen's kappa coefficient was reported for two of the instruments (ELNEC-J-CQ, PCKT), ranging between 0.84 and 0.88 and indicating acceptable relative repeatability, and some of the studies reported the internal reliability of the instrument to be reliable based on several different statistical analyses (Lazenby et al., 2012; Slatten et al., 2014).

5. Discussion

It is important to find instruments that are reliable and valid, but also have suitable content for assessing nurses' expertise in palliative care nursing. Several instruments have been used to evaluate nurses' competence in palliative care (Hujer et al., 2009; Bing-Jonsson et al., 2014; Mager & Lang, 2016; Yaakup et al., 2014) and competence assessment is assumed to significantly improve

the skills of nurses (Desbiens et al., 2011). In this integrative review, the content of the ten instruments for measuring nurses' palliative care knowledge and skills can be separated into three different categories: 1) care for the patient, 2) care for the patient's family and 3) professional requirements (Table 2). The nurses' knowledge and skills, as defined in the instruments, mainly followed the definition of palliative care nursing (Sherman et al., 2010) and the international guidelines for palliative nursing competence, taking the physical, psychological, social, spiritual, cultural, end-of-life, ethical and legal aspects of care, patients and their families, cooperation and multi-professionalism, interaction skills, identification of personal skills and continuing professional development into account (Gamondi et al. 2013; Ferrell et al., 2018). In the studies, the instruments were reported to be valid and reliable for use in knowledge and skill assessment, although the evaluation was not particularly extensive for all the instruments. There were also differences in the reliability and validity of the same instrument as reported in different studies, especially when the instrument was used in different countries and cultures. This was mainly evident with the PCQN instrument, which has been utilised in several nations. The validity and reliability reported in original study were not convergent in all cases when the instrument was used in a different cultural environment, although the instrument was deemed to be acceptable (Choi et al., 2012; Chover-Sierra et al., 2017a).

Healthcare professionals need to have sufficient ability to provide palliative care (Weissman & Blust, 2005; Miyashita et al., 2007; Hales et al., 2010; Schulman-Green et al., 2011; Gamondi et al., 2013). In particular, the nurses' expertise in palliative care is a significant factor affecting the quality of the care (Huijjer et al., 2009). The instruments analysed in this review assessed nurses' knowledge and skills through knowledge tests and skill-evaluation self-tests. The knowledge tests aimed to evaluate nurses' level of knowledge through 'right' or 'wrong' answers. These types of instruments can be used to evaluate nurses' knowledge in situations where there is a need to have objective information about the level of knowledge. Self-evaluation instruments assessed nurses'

self-perceived skills in different areas of palliative care using Likert-scales. Skill-measuring instruments are appropriate when nurses' own opinion of their expertise is required.

5.1 Strengths and Limitations

The review was conducted following Whitemore and Knafl's (2005) integrative review methodology that includes a plan agreed by the team, review questions, inclusion and exclusion criteria, and approaches to data extraction and analysis to ensure the repeatability of the study. PRISMA guidelines for systematic literature reviews and meta-analyses were also followed to ensure explicit reporting (Moher et al., 2009). At least two members of the team were included at all stages with arbitration, if required provided by a third team member. All members of the team agreed on the final analysis.

In order to cover the research topic accurately, and to obtain reliable results and studies (Conn et al., 2003), the database search was comprehensive. The search strategy was developed using MeSH terms and the expertise of the librarian. The Boolean operators 'AND' and 'OR' were used to create search phrases. Search and review results were recorded using PRISMA. The review of the abstracts and full texts, as well as the evaluation of the quality of the studies, was carried out by two independent reviewers to increase the reliability of the study selection and quality assessment. The content analysis process was undertaken by three reviewers and there was a high level of agreement regarding the findings. The final agreement on the findings resulted from discussion between members of the author team.

There are also some limitations to consider in this review. The quality assessment had limitations due to the JBI criteria not fully corresponding to all the research settings and content of the studies. There was a need to formulate a common view on the use and interpretation of the criteria among the evaluators so that the estimates would be consistent. This may have affected the results of the assessment of the quality. There was also some variation in the quality of the studies and differences existed regarding the grade of study design and methods in some extent, which

should be considered when evaluating the generalisation of the results of this study. At the abstract analysis stage, studies were restricted to articles written in English or Swedish. It is possible that some information has been excluded from the review due to language limitations; however, the search produced plenty of studies and only a few of the studies were excluded by language.

6. Conclusions

There are several knowledge tests and self-evaluation instruments for assessing nurses' palliative care knowledge and skills. In the instruments, the nurses' knowledge and skills in specialised palliative care settings reflect the criteria of holistic care of the patient, assisting the family and ensuring access to adequate professional resources. The content of the instruments followed the international guidelines for the core areas of palliative care competence (Gamondi et al. 2013; Ferrell et al., 2018). The psychometric properties of the instruments were reported to varying degrees, mainly focusing on internal consistency and content validation. The cultural differences and national guidelines that might have influenced the development and content of the instruments must be taken into consideration when selecting appropriate instruments for evaluation. Validation of the existing instruments for use in other cultures offers an opportunity to broaden the use of the instruments internationally.

7. Relevance to Clinical Practice

This review generated knowledge about the instruments that can be used when evaluating the palliative care knowledge and skills of nurses working in specialised care settings. The instruments used for palliative care knowledge and skill assessment were designed and described according to their content and psychometric properties.

This review provides an overall description of instruments for assessing palliative care knowledge and skills in specialised care settings. The results can be utilised to improve the quality of palliative care by evaluating the knowledge and skills of nursing staff. In addition, the results can be exploited when considering the need for palliative care education or when identifying

educational gaps by assessing nurses' existing proficiency and identifying a possible lack of knowledge or skill in palliative care expertise. This review considers the content areas of the instruments, but the reliability must be approached with caution and validation studies in other cultures are therefore recommended.

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Tables

TABLE 1. Studies included in the review

Study	Purpose	Design	Participants	Data collection	Analysis	Outcome	Quality (JBI)
Abudari et al. 2014, Saudi Arabia	To assess knowledge of and attitudes towards palliative care	A descriptive cross-sectional	N=731 nurses from 30 different nationalities (working at the hospital), n=395	PCQN [†]	Descriptive statistics, independent t-test (to compare knowledge and attitudes), ANOVA (post hoc pair-wise comparisons), Pearson's correlations, multiple regression analysis	Knowledge of palliative care was low (mean 9,06/20) and attitudes towards palliative care moderate (111,66/150). Palliative care training, nursing experience and the level of palliative care integration in health care in the nurses home country significantly affected the scores.	4/5
Autor et al. 2013, USA	To assess knowledge of palliative care	Cross-sectional	N=251 oncology, intensive care and heart failure nurses, n=143	PCQN [†]	ANOVA (to compare the mean of correct responses by unit), student t-test (to assess differences of correct answers based on experience) Pearson correlation coefficient	Nurses were moderately but not fully knowledgeable about palliative care (correct responses 67,6%). Number of palliative patients cared for, experience or awareness of institutions palliative care team were not related to the correct answers.	4/5
Arahata et al. 2018, Japan	To develop a scale of knowledge and attitudes toward palliative and EOL care and to confirm the validity and reliability of the scale.	Cross-sectional	N=1745 nurses of 10 hospitals, n=762	ELNEC-J-CQ [‡]	IRT, κ coefficient, exploratory factor analysis (selection of the items), ICC, Cronbach's α (internal consistency and reliability), known group validity (differences between groups)	The ELNEC-J CQ is valid and reliable to evaluate knowledge and attitudes towards palliative care for nurses.	5/5
Choi et al. 2012, Korea	To examine nurses' knowledge of end-of-life care and its relations to nurses' characteristics.	Descriptive, correlational study	N=400 nurses at two university hospitals, n=368	PCQN [†]	Descriptive statistics, t-test, Pearson correlation, ANOVA	The mean score of the knowledge was low (8,95/20). To provide optimal end-of-life care there is need for continuing education.	5/5
Chover-Sierra et al. 2017a, Spain	Adaptation of the PCQN – instrument into the Spanish language.	Descriptive, cross-sectional	n=159	PCQN [†]	CVI, kappa-index (validity), Cronbach's alpha, KR-20 (reliability), IRT (difficulty)	The instrument is useful for measuring Spanish nurses' knowledge in palliative care.	4/5

Chover-Sierra et al. 2017b, Spain	To determine the level of knowledge in palliative care of nursing staff at a Spanish tertiary care hospital.	Descriptive, cross-sectional study	N=360 nurses working in inpatient wards, emergency unit or critical care ward, n=159	PCQN [†]	Descriptive analysis, correlation studies, tests of independence among the variables, parametric and non-parametric tests	The knowledge about palliative care were sufficient (10,8/20, percentage of right answers 54%). Education about palliative care is needed.	6/7
Desbiens & Fillion 2011, Canada	To develop a new instrument to measure perceived PC nursing self-competence.	Descriptive design with qualitative and quantitative methods	N=17 individual interviews and focus group, N=8 cognitive interviews	PCNSC [§]	Inductive and deductive content analysis, focus group interview, expert group discussion, CVI, Banduras SCT.	Palliative Care Nursing Self-competence Scale was created.	5/5
Feder et al. 2018, Israel	To describe oncology and palliative care nurses' self-perceived competence in providing palliative care and to explore educations, experiences and workplace factors influence to skills.	Cross-sectional	N=122 oncology and PC nurses, n=105	EPCS [¶]	Descriptive statistics (means, standard deviations, percentages to determine nurses' perceived competences), sub-score calculation, one way ANOVA and Tukey's post hoc correction (comparisons of EPCS n=sub-scores)	Nurses felt most competent in speaking with other health professionals about the care of dying and least in discussing advance medical directives with patients and families. Perceived work place support was limited.	5/5
Iranmanesh et al. 2012, Iran	To examine oncology and intensive care nurses' knowledge about palliative care in Southeast Iran.	Cross-sectional descriptive	N=140 ICU and oncology nurses, n=116	PCQN [†]	Descriptive statistics, Pearson correlation coefficient, independent t test, one way ANOVA.	Nurses knowledge about palliative care was low (7,59/20) which may be connected with Iranian nurses lack of education and experience and some cultural limitations.	5/5
Ke et al. 2008, Taiwan	To explore the state of knowledge, attitudes and behavioral intentions among nurses from general wards and ICUs toward providing artificial nutrition and hydration for terminal cancer patients.	Cross-sectional	n= 197 nurses from gastroenterology, general surgery and ICU	Questionnaire on the Knowledge, Attitudes, and Behavioral Intentions of Medical personnel in Providing Artificial Nutrition and Hydration ^{††}	Frequency, mean, SD.	Nurses' knowledge about palliative care was high (accurate-answer rate 96,75%), knowledge about ANH was lower (a-ar 53,67%).	4/5
Kim & Hwang 2014, South Korea	To describe nurses' knowledge and attitude regarding palliative care and to evaluate how knowledge of and attitude towards palliative care in nurses influence their clinical practice in Soul, South Korea.	Cross-sectional descriptive	n=90 nurses from units with cardiac patients	PCQN [†]	Descriptive statistics, t-test, ANOVA, correlation and multiple regression analysis.	Nurses level of knowledge (48,3%) correct answers, attitude, coping and preparedness relating to palliative care were low. Palliative training is needed.	5/5
Kim et al. 2011, Korea	To describe Korean nurses' knowledge of hospice and palliative care and to identify the effect of the ELNEC-program on improving knowledge.	Pre-test post-test design survey	N=141 nurses participating the ELNEC core course, n=111	PCQN [†]	Descriptive statistics, independent sample t-test, correlations, one way ANOVA, paired t-test	Korean nurses who attended the ELNEC course had moderate to high level of knowledge of hospice and palliative care (12,5/20).	5/7

Lazenby et al. 2012, USA	To assess the validity of EPCS-instrument.	Cross-sectional	n=369 nurses, physicians and social workers, including n=261 nurses	EPCS [†]	Factor analysis (FA), Kaiser-Myer Olkin test, Bartlett's test, Eigen values, the scree plot, and the interpretability of the various factor solution. Item loadings on each factor were estimated by Oblimin. Pearson product-moment correlation, ANOVA), Bonferroni correction. multivariate linear regression, Cronbach's alpha.	The scale has strong internal reliability. Each of its three factors is distinct and internally reliable.	5/5
Ly et al. 2014, Vietnam	To explore palliative care knowledge, attitudes and perceived self-competence of nurses in oncology settings in Hanoi, Vietnam. To examine factors that influence the knowledge. Explore relationships between knowledge, attitudes and self-competence.	Cross-sectional survey	n=251 oncology nurses	PCNSC [§]	Frequencies, percentages, normality tests, student t-test for two groups, ANOVA, Pearson's correlation for continuous independent variables.	The knowledge about palliative care needs improvement especially related to pain and symptom management.	5/5
Montagnini et al. 2018, USA	To describe health-care professionals' self-perceived competencies regarding the provision of EOL care in hospitalized patients.	Descriptive study	n=1197 health care providers, including n=613 nurses	EOL-Q ^{‡‡}	Means, ANOVA, correlations	Competencies among health-care providers, disciplines and levels of care differ. EOL care education is needed.	4/5
Nakazawa et al. 2009, Japan	To develop and validate the Palliative Care Knowledge Test and to identify the factors associated with palliative care knowledge	Cross-sectional	N=940 registered nurses from university hospital and general hospital, n=773	PCKT ^{§§}	Percentages, kappa coefficients, IRT, KR-20, correlation coefficients, unpaired t-test, ANOVA, Pearsons product-moment correlation coefficients, multivariate linear regression, regression coefficients.	The instrument can be used to assess health care providers knowledge about palliative care. Number of terminal care patients cared was associated with higher total score. However over all nursing experience was not related to better knowledge.	5/5
Nakazawa et al. 2017, Japan	To determine changes in nurses knowledge, difficulties and self-reported practices through of the results of two nationwide surveys in Japan before and after implementation of the Cancers Control Act.	Analysis of two observational studies	N=7922 nurses, n=3438 nurses from previous study (2008)	PCKT ^{§§}	Nonpaired Student t-test, multivariate linear regression, Hedges g, ANOVA, chi-square test.	Japanese nurses knowledge, difficulties and self-reported practices improved during 2008-2015.	5/5

Price et. al. 2017, not reported	To assess nurses' self-perceived competence of knowledge, attitudes and behavior about palliative and EOL care.	Descriptive survey	n=583 registered nurses from acute care and ICU	EOL-ICU ^{¶¶}	Means, one way ANOVA, correlations, Cronbach's alpha, theme identification, grouping.	Educational needs are different according to patient population and acuity setting and also related to demographic variables of staff.	3/5
Razban et al. 2015, Iran	To examine the correlation between nurses' knowledge about and attitude towards palliative care.	Descriptive, correlational study	N=140, n=113 oncology and ICU nurses	PCQN [†]	Descriptive statistics, Pearson correlation coefficient, Independent T-test, ANOVA	PCQN mean score was 7.59±2.28 out of 20. Participants had moderately negative to neutral attitudes toward palliative care.	4/5
Sato et al. 2014, Japan	To investigate palliative care knowledge, difficulty and self-reported practice of nurses caring cancer patients.	Cross-sectional survey	N=3008, n=2378 nurses working in cancer-related specialties	PCKT ^{§§}	Descriptive statistics, t-test, ANOVA, chi-square test, univariate analysis, multivariate analysis	Knowledge, difficulty and self-reported practice for symptom management was insufficient.	5/5
Schnell-Hoehn et al. 2017, Canada	To explore palliative care knowledge of cardiac nurses.	Descriptive cross-sectional	N=126, n= 76 cardiac nurses	PCQN [†]	Descriptive statistics, continuous variables (means, sd:s), t-test to determine comparisons	Mean score 15/20. Knowledge gaps existed in some sections of the care.	3/5
Shimizu et al. 2016, Japan	To develop and validate scales to assess home care nurses attitude, self-reported practices, difficulties and knowledge regarding home palliative cancer care.	Cross-sectional survey	N=125, n=122 home care nurses	Self-developed scales ^{†††}	Descriptive statistics, exploratory factor analysis, Cronbach's alpha, Item Response Theory (IRT), multiple logistic regression model, univariate analysis	The developed scales were valid and reliable to evaluate home care nurses attitude, self-reported practices, difficulties and knowledge regarding home palliative cancer care. Scales are useful for evaluating education programs.	5/5
Slåtten et al. 2014, Norway	To test and validate a new instrument for self-assessment for core competences in palliative care.	Cross-sectional	N=235 clinical nurse specialists, n=122	NCPC – instrument ^{†††}	Cronbach's alpha (internal consistency), Little's missing completely at random (MCAR) test, chi-square test, structural equation model, confirmatory factor analysis, comparative fit index, Tucker-Lewis fit index, root mean square error of approximation	The instrument has potential refining competence in palliative care, although it needs further testing in practice.	5/5

[†] PCQN – instrument = the Palliative Care Quiz for Nursing

[‡] ELNEC-J CQ = End-of-Life Nursing Education Consortium-Japan Core Quiz

[§] PCNSC = Palliative Care Nursing Self-competence Scale

[¶] EPCS – instrument = The End-of-Life Professional Caregiver Survey

^{††} Questionnaire on the Knowledge, Attitudes, and Behavioral Intentions of Medical personnel in Providing Artificial Nutrition and Hydration

^{††} EOL-Q = End-of-Life Questionnaire

^{§§} PCKT – instrument = Palliative Care Knowledge Test

^{¶¶} EOL-ICU = The Scale of End-Of-Life Care in ICU

††Self-developed scales

†††NCPC – instrument = Nurses Core Competences in Palliative Care

TABLE 2. The content of knowledge and skills evaluating instruments

Main categories	Categories	Sub-categories	Instrument
Care for the patient	General basis of palliative care	Principles in palliative care	EPCS (Lazenby et al., 2012, Feder et al., 2018), Ly et al., 2014, NCPC (Slåtten et al., 2014), PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014), PCQN (Kim et al., 2011, Choi et al., 2012, Iranmanesh et al., 2012, Autor et al., 2013, Abudari et al., 2014, Kim & Hwang, 2014, Razban et al., 2015, Schnell-Hoehn et al., 2017, Chover-Sierra et al., 2017a, Chover-Sierra et al., 2017b), PCKT (Nakazawa et al., 2009, Sato et al., 2014, Nakazawa et al., 2017), Shimizu et al. 2016
		Identifying patients applicability to palliative care	EPCS (Feder et al. 2018, Lazenby et al. 2012), PCQN (Kim et al., 2011, Choi et al., 2012, Iranmanesh et al., 2012, Autor et al., 2013, Abudari et al., 2014, Kim & Hwang, 2014, Razban et al., 2015, Schnell-Hoehn et al., 2017, Chover-Sierra et al., 2017a, Chover-Sierra et al., 2017b), PCKT (Nakazawa et al., 2009, Sato et al., 2014, Nakazawa et al., 2017), Shimizu et al., 2016
	Patient's involvement to his/her own care	Support for decision making	ELNEC-J-QC (Arahata et al., 2018), EOL-Q (Montagnini et al., 2018), EOL-ICU (Price et. al. 2017), PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014)
		Support for management in daily life	PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014)
	Psychosocial support	Identifying patient's psychical needs	EOL-Q (Montagnini et al. 2018), EOL-ICU (Price et. al. 2017), PCNSC (Desbiens & Fillion 2011, Ly et al. 2014), PCQN (Kim et al., 2011, Choi et al., 2012, Iranmanesh et al., 2012, Autor et al., 2013, Abudari et al., 2014, Kim & Hwang, 2014, Razban et al., 2015, Schnell-Hoehn et al., 2017, Chover-Sierra et al., 2017a, Chover-Sierra et al., 2017b)
		Supporting coping with life-limiting illness	EOL-Q (Montagnini et al., 2018), EOL-ICU (Price et. al., 2017), PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014)
	Spiritual support	Assess and recognize patients spiritual needs	EOL-Q (Montagnini et al., 2018), EOL-ICU (Price et. al., 2017), PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014)
		Dealing with spiritual perspectives of the patient	EPCS (Feder et al. ,2018, Lazenby et al., 2012), Ly et al., 2014, PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014)
	Cultural aspects in care	Identifying cultural aspects	EPCS (Feder et al., 2018, Lazenby et al., 2012), EOL-Q (Montagnini et al., 2018), EOL-ICU (Price et. al., 2017)
		Operating with cultural aspects	EPCS (Feder et al., 2018, Lazenby et al., 2012), PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014)
	Pharmacological treatment	Efficacy of drugs and medication	PCQN (Kim et al., 2011, Choi et al., 2012, Iranmanesh et al., 2012, Autor et al., 2013, Abudari et al., 2014, Kim & Hwang, 2014, Razban et al., 2015, Schnell-Hoehn et al., 2017, Chover-Sierra et al., 2017a, Chover-Sierra et al., 2017b), PCKT (Nakazawa et al. 2009, Sato et al. 2014, Nakazawa et al. 2017), Shimizu et al. 2016
		Knowledge about side-effects	PCQN (Kim et al., 2011, Choi et al., 2012, Iranmanesh et al., 2012, Autor et al., 2013, Abudari et al., 2014, Kim & Hwang, 2014, Razban et al., 2015, Schnell-Hoehn et al., 2017, Chover-Sierra et al., 2017a, Chover-Sierra et al., 2017b), PCKT (Nakazawa et al., 2009, , Sato et al., 2014, Nakazawa et al., 2017), PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014), Shimizu et al., 2016
	Physical symptom management	Respiratory symptom management	EOL-Q (Montagnini et al., 2018), EOL-ICU (Price et al., 2017), PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014), PCKT (Nakazawa et al., 2009, , Sato et al., 2014, Nakazawa et al., 2017), Shimizu et al., 2016
		Gastro-intestinal symptom management	EOL-Q (Montagnini et al., 2018), EOL-ICU (Price et al., 2017), NCPC (Slåtten et al., 2014), PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014)
		Pain evaluation	PCQN (Kim et al., 2011, Choi et al., 2012, Iranmanesh et al., 2012, Autor et al., 2013, Abudari et al., 2014, Kim & Hwang, 2014, Razban et al., 2015, Schnell-Hoehn et al., 2017, Chover-Sierra et al., 2017a, Chover-Sierra et al., 2017b), PCKT (Nakazawa et al., 2009, , Sato et al., 2014, Nakazawa et al. ,2017), PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014), Shimizu et al., 2016

		Pain management	EOL-Q (Montagnini et al., 2018), EOL-ICU (Price et. al., 2017), PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014), PCKT (Nakazawa et al., 2009, , Sato et al., 2014, Nakazawa et al., 2017), PCQN (Kim et al., 2011, Choi et al., 2012, Iranmanesh et al., 2012, Autor et al., 2013, Abudari et al., 2014, Kim & Hwang, 2014, Razban et al., 2015, Schnell-Hoehn et al., 2017, Chover-Sierra et al., 2017a, Chover-Sierra et al., 2017b)
	End-of-life care	Symptoms and signs of approaching death	PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014), Shimizu et al., 2016
		Identifying physical needs and symptom management	PCQN (Kim et al., 2011, Choi et al., 2012, Iranmanesh et al., 2012, Autor et al., 2013, Abudari et al., 2014, Kim & Hwang, 2014, Razban et al., 2015, Schnell-Hoehn et al., 2017, Chover-Sierra et al., 2017a, Chover-Sierra et al., 2017b), PCKT (Nakazawa et al., 2009, , Sato et al., 2014, Nakazawa et al., 2017), PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014), Shimizu et al. 2016, Questionnaire on the Knowledge, Attitudes, and Behavioral Intentions of Medical personnel in Providing Artificial Nutrition and Hydration (Ke et al., 2008)
		Emotional support	PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014)
Care for the family	Involving family to the care of the patient	Family's involvement to the care planning	EOL-Q (Montagnini et al. ,2018), EOL-ICU (Price et. al., 2017), PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014)
		Family's involvement to the care	EPCS (Lazenby et al., 2012, Feder et al., 2018), Ly et al., 2014, PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014)
	Psychosocial support	Identifying family's psychical needs	EOL-Q (Montagnini et al. 2018), EOL-ICU (Price et al., 2017), PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014)
		Supporting coping with patient's illness	EOL-Q (Montagnini et al., 2018), EOL-ICU (Price et al., 2017), EPCS (Feder et al., 2018, Lazenby et al. ,2012), Ly et al., 2014, PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014)
		Support in undergoing death	PCQN (Kim et al., 2011, Choi et al., 2012, Iranmanesh et al., 2012, Autor et al., 2013, Abudari et al., 2014, Kim & Hwang, 2014, Razban et al., 2015, Schnell-Hoehn et al., 2017, Chover-Sierra et al., 2017a, Chover-Sierra et al., 2017b), PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014)
	Spirituality	Assess and recognize family members spiritual needs	EOL-Q (Montagnini et al., 2018), EOL-ICU (Price et al., 2017), PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014)
		Dealing with spiritual perspectives of the family	EPCS (Lazenby et al., 2012, Feder et al., 2018), PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014)
	Cultural aspects in care	Identifying cultural aspects	EPCS (Lazenby et al., 2012, Feder et al., 2018), EOL-Q (Montagnini et al., 2018), EOL-ICU (Price et al., 2017)
		Operating with cultural aspects	EPCS (Feder et al., 2018, Lazenby et al., 2012), PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014)
Professional requirements	Ethicalness	Identifying ethical issues	ELNEC-J-QC (Arahata et al., 2018), NCPC (Slåtten et al., 2014), PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014)
		Operating with ethical issues	PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014)
	Coping with death	Preparedness for death	ELNEC-J-QC (Arahata et al., 2018), EOL-Q (Montagnini et al., 2018), EOL-ICU (Price et al., 2017), NCPC (Slåtten et al., 2014)
		Adaptation for dying	PCNSC (Desbiens & Fillion ,2011, Ly et al., 2014)
	Collaboration skills	Interpersonal collaboration	NCPC (Slåtten et al. ,2014)
		Multi-professional collaboration	EPCS (Lazenby et al., 2012,Feder et al., 2018), NCPC (Slåtten et al., 2014), PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014)
	Personal resources	Identifying own resources and needs	EPCS (Lazenby et al., 2012, Feder et al., 2018), PCQN (Kim et al., 2011, Choi et al., 2012, Iranmanesh et al., 2012, Autor et al., 2013, Abudari et al., 2014, Kim & Hwang, 2014, Razban et al., 2015, Schnell-Hoehn et al., 2017, Chover-Sierra et al., 2017a, Chover-Sierra et al., 2017b), PCNSC (Desbiens & Fillion, 2011, Ly et al., 2014)
		Support from workplace	EPCS (Lazenby et al., 2012, Feder et al., 2018)

TABLE 3. Description of the palliative care competence instruments

	Instrument/ developer	Source	Aim of the instrument	Items[†]	Knowledge / self-evaluation instrument	Subscales/ contents	Validity and reliability of the instrument
1	PCQN (the Palliative Care Quiz for Nursing), Ross et al. 1996	Abudari et al. 2014, Autor et al. 2013, Choi et al. 2012, Chover-Sierra et al. 2017a, Chover-Sierra et al. 2017b, Iranmanesh et al. 2012, Kim & Hwang 2014, Kim et al. 2011, Razban et al. 2015, Schnell-Hoehn et al. 2017	To quantify knowledge regarding palliative care.	20 questions with true, false, I do not know.	Knowledge	Understanding of philosophy, principles of PC, pain, symptom, management, psychosocial care.	Test-retest 0,56, KR-20 0,65-0,78, item discrimination index greater than 0,50, Cronbach's alpha 0,67, Content validity index 0,76-0,85, IRT 0,19-0,97. Acceptable reliability and validity reported in current and previous studies.
2	ELNEC-J CQ (End-of-Life Nursing Education Consortium-Japan Core Quiz), Arahata et al. 2018	Arahata et al. 2018	To assess knowledge and attitude improvement toward palliative and EOL care.	90 items in 9 domains about knowledge (right, wrong, unsure) and 10 items in 3 domains about attitudes (5-point Likert scale from strongly disagree to strongly agree).	Knowledge	Knowledge: Nursing care at the end of life, pain management, symptom management, ethical issues in EOL care, cultural considerations in EOL care, communication, loss, grief, bereavement, preparation for and care at the time of death, EOL care for elderly. Attitude: Confidence in providing quality EOL care, ability to implement interventions to improve EOL care, motivations to provide quality EOL care.	Internal consistency sufficient: KR-20 of all knowledge items 0,85, uneven result for knowledge domains KR-20 0,57-0,76. Reliability sufficient: ICC range for all knowledge items 0,84.
3	PCNSC = Palliative Care Nursing Self Competence scale, Desbiens & Fillion 2011	Desbiens & Fillion 2011, Ly et al. 2014	To evaluate nurses self-perceived competence.	10 items with 1-6 rated strength of self-competence (not at all competent to highly competent).	Self-evaluation	Pain management, other symptoms management, psychological care, social care, spiritual care, care associated with functional status, ethical and legal issues, interprofessional collaboration and communication, personal and professional issues related to nursing care, end-of-life care.	Cronbach's alpha 0,97, content validity index 0,95.
4	EPCS – instrument (The End-of-Life Professional Caregiver Survey) Lazenby et al. 2012	Feder et al. 2018, Lazenby et al. 2012	To assess core competencies in palliative care	28 items to assess competencies with 5-point Likert scale.	Self-evaluation	Patient and Family-Centered Communication, Cultural and Ethical Values, Effective Care Delivery.	Cronbach's alpha 0,96 for all items, PFCC (Cronbach's alpha 0,95, Eigenvalue 1,0, inter-item correlations 0,37-0,50), CEV (Cronbach's alpha 0,89, Eigenvalue 1,7, inter-item correlations 0,55-0,75) and ECD (Cronbach's alpha 0,87, Eigenvalue 1,1, inter-item correlations 0,52-0,74). Correlations among three factors and the overall EPCS 0,80-0,92. Scale exhibits strong internal reliability
5	Questionnaire on the Knowledge, Attitudes, and Behavioral Intentions of Medical personnel in Providing Artificial Nutrition and Hydration, Ke et al. 2008	Ke et al. 2008	To assess knowledge, attitudes and behavioral intentions in providing ANH.	7 part questionnaire, 17 items for knowledge (true and false/unknown), attitudes 5-point Likert scale (strongly disagree/unimportant to strongly agree/very important).	Knowledge	Demographic characteristics, knowledge of palliative care, knowledge of provision of ANH for terminal cancer patients, attitudes, behavioral intentions, subjective norms, influencing factors.	Content validity index 0,93, KR-20 0,68 to 0,80 in different items.

6	EOL-Q = End-of-Life Questionnaire, Montagnini et al. 2018 (original EOL-Q-ICU, Montagnini et al. 2012)	Montagnini et al. 2018	To assess self-perceived confidence in providing end-of-life care.	28 items, 5-point Likert-type scale (strongly disagree to strongly agree, including option “not acceptable”).	Self-evaluation	Patient and family decision making, communication within the team, patients and families, continuity of care, emotional support for patients and families, symptom management, spiritual support for patients and families, emotional and organizational support for staff.	Cronbach’s alpha 0,92 total. Internal consistency reliability reported high in previous study.
7	PCKT – instrument = Palliative Care Knowledge Test, Nakazawa et al. 2009	Nakazawa et al. 2009, Nakazawa et al. 2017, Sato et al. 2014	To identify the factors associated with palliative care knowledge.	40 items with right, wrong, unsure.	Knowledge	Philosophy, pain, dyspnea, delirium, gastrointestinal symptoms.	ICC 0,88 overall and 0,61-0,82 in each domain, KR-20 0,81, test-retest kappa coefficient 0,26-0,74, validity assessed by expert discussions and IRT difficulty -2,9 - 3,09, discrimination 0,33-2,25. Good internal consistency, test-retest reliability, face validity and known-group validity.
8	EOL-ICU = The Scale of End-Of-Life Care in ICU, Montagnini et al. 2012	Price et. al. 2017	To assess self-perceived confidence in providing EOL care in the ICU setting.	28 items, 5-point Likert-type scale (strongly disagree to strongly agree, including option “not acceptable”).	Self-evaluation	Decision making, communication, continuity of care, emotional support for patients and families, symptom management, spiritual support for patients and families and emotional support for staff.	Cronbach’s alphas 0,69-0,93.
9	Self-developed scales	Shimizu et al. 2016	To evaluate home care nurses attitudes towards terminal home care, self-reported practices in home palliative cancer care, difficulties experienced in providing home palliative cancer care and knowledge of home palliative cancer care.	Knowledge 31 items (true, false), attitude 12 items, self-reported practices 26 items, difficulties 18 items all with 5-point Likert scale.	Knowledge	Symptom palliation, regional cooperation, communication with medical practitioners, philosophy, pain and opioids, dyspnea, psychiatric problems, gastrointestinal problems, dying care. Confidence in staff support, confidence in communication with physicians, willingness to provide home palliative cancer care, confidence in home palliative cancer care, family care, coordination with care manager/care person, patient- and family-centered care, pain management, respect for the patient’s/family’s preferences for place of care, coordination with family/hospital physicians, dying care and family care, communication with patient and family,	Cronbach’s alphas 0,61-0,70, IRT difficulty -3,24 -1,05, discrimination 0,56-3,06. Construct validity good and internal consistency satisfactory.
10	NCPC – instrument = Nurses Core Competences in Palliative Care	Slåtten et al. 2014	To evaluate nurses’ core competencies in palliative care.	26 questions rated with 5-point Likert scale (I don’t agree at all to agree completely	Self-evaluation	Knowledge and Symptom Management, Systematic Use of the Edmonton Symptom Assessment System (ESAS), Teamwork Skills, Interpersonal Skills, Life Closure Skills.	Cronbach’s alphas 0,51-0,97 in different items, Chi-square 368 (d.f. = 283, n=122, P < 0,05). CFI 0,95, TLI 0,95, RMSEA 0,05 (Lo 90 = 0,26 and HI 90 = 0,06). The construct validity having acceptable factor loading

				including option “not relevant”).			values supporting the internal structure of the instrument.
† Items assessing attitude were not analyzed							

Figure legends:

FIGURE 1. Retrieval of the studies (PRISMA)
From: Moher, .D, Liberati, A., Tetzlaff, J., Altman, D. G., The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097)

